(54) Title: MONTAGE FOR AUTOMATED MARKET SYSTEM

(57) Abstract: A graphical user interface for an electronic market for trading products includes an aggregation window which displays additional aggregate quotes for a plurality of price levels of a product traded in the market. A trading system includes client station for entering quotes for securities. The clients have graphical user interfaces at which quotes can be entered and displayed at multiple price levels. The system handles a quote size that is displayable and attributable to a specific market participant, a reserve quote size that is neither displayable nor attributable to a specific market participant, and an additional aggregate quote size that is displayable but not attributable to a specific market participant.

IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

— *Without international search report and to be republished upon receipt of that report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

MONTAGE FOR AUTOMATED MARKET SYSTEM

BACKGROUND

This invention relates to order entry and display in electronic markets.

One example of an electronic market is The Nasdaq Stock Market[SM]. The
Nasdaq Stock Market[SM] uses multiple entities referred to as market makers that are
independent dealers that compete for investors' orders. The Nasdaq market is an example of
an electronic trading market. Another example of an electronic trading system is the
OptiMark[SM] system (OptiMark Technologies, Inc.). In addition, changes in order handling
rules have required market makers to display limit orders from electronic communication
networks.

SUMMARY

According to an aspect of the invention, a method of trading securities
includes receiving additional aggregate size quotes for a security.

According to an additional aspect of the invention, an electronic market for
trading of securities includes a plurality of client stations for entering quotes for securities
and a server process that receives quotes from the clients, aggregates quotes and causes
aggregate quotes for a plurality of price levels to be displayed on the client systems.

According to an additional aspect of the invention, a client station for entering
quotes for securities includes a graphical user interface on the client at which quotes can be
entered at a price level. The interface comprises controls to enter a quote size that is
displayable and attributable to a specific market participant, a reserve quote size that is
neither displayable nor attributable to a specific market participant, and an additional
aggregate quote size that is displayable but not attributable to a specific market participant.

According to an additional aspect of the invention, a graphical user interface
for an electronic market for trading products includes an aggregation window which displays
additional aggregate quotes for a plurality of price levels of a product traded in the market.

One or more of the following advantages may be provided by one or more
aspects of the present invention.

The execution system improves market transparency and reduces market
fragmentation that can occur with multiple, competing, market centers. The execution
system can enhance the collection, aggregation and display of pre-trade information enabling

fast, efficient, low-cost access to liquidity. The execution system combines the strengths of a dealer market and an agency market while enabling any alternative market venue to link into the execution system. The execution system aggregates pre-trade information from various market venues and displays the information in a manner that adds depth to the market place.

5 It also preserves the ability for market makers to advertise quotes to promote negotiated transactions. At the same time, the execution system does not invoke global time priority and prohibit market participants from interacting with their own orders and internalizing order flow away from the market center. The execution system thus enhances collection of pre-trade information, aggregation of pre-trade information, display of pre-trade information, and

10 improves access to liquidity through execution systems.

The graphical user interface allows for display of multiple price levels for various types of trading interest. It presents depth to the market and improves market liquidity and transparency while minimizing disclosure of identity of trading interest which should encourage greater quote and order display.

15 BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram showing an electronic market.

FIG. 2 is a flow chart showing an order receipt process in the market of FIG. 1.

FIGS. 3A-3B are flow charts showing an alternative order receipt process for

20 the market of FIG. 1.

FIGS. 4-6 are diagrams of order entry graphical user interfaces.

FIG. 7 is a diagram of an entry format for quotes.

DESCRIPTION

25 Referring to FIG. 1, an electronic market 10 is shown. The electronic market includes client systems 12 that access an electronic market system 20. The client systems 12 can be broker/dealer systems 12a, electronic communication networks (ECN's) 12b, market-marker systems 12c, and a connection with other exchanges 12d. The connections can use existing protocols such as SelectNet® for negotiation and the Small Order Execution System

30 SM (SOES SM) of Nasdaq for auto execution or an equivalent order delivery system or systems. The client systems include a processor, memory and a storage device e.g., a client

workstation or personal computer that can include a client process to enter quotes/orders into the electronic market system. The electronic market system 20 is also coupled to a clearing system 16 and a reporting system 18. The market system 20 is comprised of one or preferably a plurality of server computers generally denoted as 22 including a processor 22a,

5 main memory 22b and storage 22c. The storage system 22c includes an order display and execution process 40 that is executed in memory 22b. In general, server 22 is a complex computer server, the details of which are not important to an understanding of the present invention.

The process 40 collects pre-trade information, in the form of quotes or orders.

10 The distinction between a quote and an order depends on several factors. For example, a market maker can send a proprietary quote, i.e., a quote that represents its own trading interest or an agency quote that represents interest of a market maker sponsored entity. If one proprietary quote is sent it could be considered one order. If one agency quote is sent it also could be considered one order. If an agency quote reflects an aggregation of more than one

15 agency order, however, the aggregate agency order could be considered a quote. Entry of quotes is limited to registered market makers 12b and ECNs 12c. For any given stock, a registered market maker or ECN may directly enter a non-marketable order into the market system 20 on behalf of its customer, or it may sponsor the direct entry of an order by its customer. All sponsored quotes are sent to the market system 20 under the name of the

20 sponsoring market maker or ECN. Every registered market maker or ECN will be permitted to submit an unlimited number of non-marketable quotes to the market system 20.

Quotes submitted to the system can include a quote size, additional aggregate size and a reserve size. Quotes can also include an indication of a willingness to negotiate further. Quote Size is directly attributable to the market maker or ECN when displayed in an

25 "advertisement" section of an order display window 70 to be discussed below. Additional aggregate size is size (in addition to Quote Size) that the market maker or ECN wishes to display to the marketplace through an aggregate display in a top-half of the order display window 70. This size is not attributable to the market maker or ECN until it is executed. Reserve size is size that is never displayed to the marketplace but that is immediately

30 accessible through the order display window 70. In order to utilize Reserve Size, a market maker can be required to have a minimum amount displayed in the aggregate of quote size

and aggregate size. A quote size is a displayable quote that can require an order to be delivered for negotiation before moving on to the next price level.

A broker/dealer can receive an order from a customer. The broker/dealer can send that order to the exchange system to be executed with quotes that are posted by electronic communication networks, market makers or other markets. In this embodiment, the broker/dealer does not have the capability of posting quotes.

Referring now to FIG. 2, the order display and execution process 40 receives 42 quotes from the various sources mentioned above, i.e., market makers, ECN's and other markets/exchanges. The order entry process 40 compares 44 the received quotes to existing quotes to determine 46 whether the quotes correspond to current pre-defined quote levels 47 which, for this example, will correspond to one of three price levels that are subject to automatic execution. If the quote is within one of the current quote levels 47, the process 40 determines 48 new marketable quote sizes by adding the quote size corresponding to the received quote, to quote sizes at that price level already in the market system 20. The process 40 will display 50 the new marketable quote sizes. The order display and execution process 40 is an ongoing process that continually receives quotes and adjusts displayable price levels based upon new prices received in the quotes. If a received quote does not have a price that corresponds to an existing price level, the process 40 will store 52 the quote at a new price level and will determine 54 whether a new price level should be displayed. If a new price level should be displayed, the process 40 will change 56 current price levels and display quotes at the new current price levels.

Referring now to FIG. 3A, an alternative order entry process 40' is shown. The order entry process 40' receives 42 quotes from the various sources mentioned above. The order entry process 40' determines 43 whether the received quote corresponds to a reserve quote. If the quote does not correspond to a reserve quote then the quote is either a marketable quote or an additional aggregate quote. The order entry process 40' compares 44 the received quotes to existing quotes to determine 46 whether the quotes correspond to pre-defined quote levels which, for this example, will correspond to one of three price levels that are displayable. If the quote falls in a displayable price level it is a displayable quote eligible for automatic execution. The electronic market system 20 can accommodate more price level

depth than the three levels, e.g., a depth of 20-25 levels or more. To facilitate trading a limited number, e.g., three would be displayed at any one time.

If the quote is within one of the pre-defined quote levels, the process 40' determines 48 new marketable quote sizes by adding the quote size corresponding to the
5   received quote to quote sizes at that price level already in the market system 20. The process 40' will cause the new marketable quote sizes to be displayed 50.

Referring to FIG. 3B, the process 50 to display the marketable quote will determine 60 whether the quote is an additional aggregate quote or a displayable marketable quote. If it is a displayable marketable quote 62, the quote will be displayed 64 in the
10 advertising or current quote portion 74 at the bottom of the window 70. Otherwise, the quote will be considered to be an additional aggregate quote. The additional aggregate quote is added 66 to existing marketable quotes i.e., additional aggregate quotes and displayable quotes. The additional aggregate is also added to existing aggregate quotes for the particular entity that entered the quote. The additional aggregate quote is not attributed to the entity
15 that entered it. However, the system causes the quote to be displayed in the aggregate portion 72 of the window 70.

This process 40' is also an ongoing process that continually receives quotes and adjusts the price levels based upon new prices of quotes. If a received quote does not correspond to a predefined quote level, the process will store 52 the quote at the new level
20 and will determine 54 whether a new level of prices should be displayed. If a new price level should be displayed, the process 40 will change current price levels and display quotes at the new current price levels.

If the process has determined 43 that the quote was a reserved quote, the process will store and sum 67 that quote in a reserved quote for the particular entity that
25 entered the reserved quote.

Referring now to FIG. 4, an order display graphical user interface (GUI) 70 is shown. In this embodiment, the order display GUI 70 includes two regions. A first region 72 displays aggregated bids and offers and includes a first line 72a to display the price levels for best bid and best offer along with quote sizes. The quotes sizes are the total aggregate
30 number of displayable shares 75, 77 and aggregate agency shares 76, 78. These quotes are subject to automatic execution for both sides (bid and offer) of the inside market. The top-

half 72 of the window 74 also includes lines 72b and 72c that display the same information for the next two best bids and best offers, (i.e., next two ticks) regardless of their price distance from the inside quote. In this embodiment, the window 70 includes separate fields that specify the number of agency shares at each price level. Aggregating the agency interest and displaying agency interest separately is optional. Aggregating agency interest can be considered as exposing natural interest i.e., from participants other than market maker professionals, prior to accessing proprietary quotes.

The current quote montage 74 of the window 70 displays market-maker and ECN quotes (both price and quote size) for the purpose of advertisement to the marketplace. The current quote montage 74 of the window 70 also includes information pertaining to the inside bid and ask price with the aggregated total and agency amounts at that price, as well as information concerning the last trade, the high for the day, low for the day, previous close (PCL), change in quote (Q) and volume. In the window 70 proprietary quotes of market makers are denoted as MM1, MM2, and so forth, whereas agency quotes are identified as MM2A i.e., an agency quote sponsored by MM2 and so forth. The current quote montage 74 of the window 70 without agency quotes is similar to the long existing Nasdaq Workstation II display montage, whereas the current quote montage 74 with the agency quotes as depicted is similar to that shown in U.S. Patent Application Serial No. 09/208,942, filed on December 12, 1998 entitled "DUAL QUOTE MARKET SYSTEM" by Richard G. Ketchum et al. and assigned in part to the assignee of the present invention.

The advertisement of individual interest to the marketplace offers a starting point for arriving at a negotiated price with another market participant. Each market maker may have a proprietary and/or agency interest that is displayed under the limit order display rule. All quotes in the current quote montage of the window 70 are also included in the aggregate in the top-half if they are within the necessary distance from the inside market and are subject to automatic execution.

Under current order handling rules, market makers would be required to advertise both their best proprietary bid and offer and their best agency bid and offer in the current quote montage of the window 70. Alternatively, subject to regulatory approval, the top-half of the window 70 could be considered as an alternative to the Order Handling Rules so that a market maker would not be forced to advertise an agency quote in the current quote

montage 74 of the window 70. One advantage of this system is a significant decrease in the number of quotes in the current quote montage 74 and quote updates required to be broadcast over the market e.g., Nasdaq network. Another alternative could allow market makers to advertise a proprietary quote that is at an inferior price to their best proprietary quote in the

5   system. For example, a market maker's best proprietary bid in the window 70 may be for 1,000 shares at $20, yet the market maker may have a business reason to advertise 10,000 shares at $19½.

Referring to FIG. 5, an example to explain the various types of quotes is shown. Currently, in electronic markets such as The Nasdaq Stock Market, the market can

10   handle a quote size 80. The reserve size 82 is not displayed to the market, but is executable if an order comes in. The market system 20 provides for a third type of quote. In FIG. 5, the quotes in the phantom box 85 are meant to illustrate the quotes that can exist in the system. Only the quote size 80 as mentioned above is displayed. The other quotes shown in the phantom box 85, the reserve size 82 and the additional aggregate size quote 84, are not

15   displayed.

As shown in FIG. 5, in time priority (described below) a market maker (MM1) can have an advertized bid at $20.00 and a quote size of 1,000. Market maker MM2 can have an agency quote MM2A at $20.00 for 1,500 shares. MM1 can have a reserve size quote 82 of 20,000, as shown in phantom in FIG. 5 (not displayed to the market but existing in the

20   market system 20), and an aggregate quote size 84 of 3,000 (displayable to the market in the aggregate display 72 but not attributable to MM1. If a participant enters an order for 9900 shares in time priority (described below), e.g., 1,000 will be executed against MM1's quote size 80 since it was first posted. The balance of 8,900 will be executed from aggregate quote size 84 and the reserved quote size 82. Thus, 3,000 will be executed from the aggregate

25   quote 84 and the balance of 6900 from reserve quote 82. Thus, quote size is what a market maker desires to advertise to the market, while additional aggregate size is what the market maker is willing to advertise to the marketplace but in a manner that is not attributable to the market maker. Additional aggregate size is included in the total aggregate quotes 75 in the upper portion 72 of the window 70, but is not attributed to any market participant. Reserve

30   size is never displayed or made known to the market. Reserved size exists but is not included in the aggregate quote sizes.

Virtual price improvement

Referring now to FIG. 6, for the price level of $20 there is a total bid quote of
9,000 and a total agency quote of 5,000. In the current quote montage 74 of the window 70
market maker MM1 is bidding at the $20 price level 1,000 shares and market maker MM2
has an agency quote for 1,500 at the $20 price level. Their total quote size is 2,500. If MM1
and MM2A are the only $20 bids in the system, it can be deduced that MM2A must have
3500 shares of additional aggregate size since MM2A is the only agency quote at $20 and has
a quote size of 1,500. Since there is 5,000 shown in agency aggregate shares, MM2A must
have 3,500 shares of additional aggregate size. Market maker MM1, therefore, has 3,000 in
aggregate size. Therefore, market makers have 6,500 shares in aggregate size. If a market
participant clicks on the 9,000 button and actually wants to sell 9900 shares, the system gives
price-time priority in executing the order. Thus, the system will execute the 1,000 shares
from MM1 quote size, 1500 from MM2A quote size, 3,000 from MM1 aggregate quote, and
3500 from MM2 aggregate quote, leaving a balance of 900 from the order.

The market system 20 includes an interval delay between jumping to new
price levels. The system will delay for e.g., 5-10 seconds before executing the balance of the
order at the next price level e.g., $19.95. During that time MM1 and MM2A have an
opportunity to take the balance of the order at $20. The market system 20 can be designed to
ask only one of the market participants to take the balance or it can determine a time priority
to see if either one desires to take the balance. One of those entities may take the 900 shares
at 5 cents more, giving the participant who submitted the order a virtual price improvement.
The quote process (not shown) immediately updates the inside bid quote to 19.95 while the
ask quote remains 20.05. The 10 second delay is a delay in the execution system for that one
order. Since there might be a queue of sell orders, the market system 20 is delayed so all
orders are delayed for execution.

As mentioned above, the collection of pre-trade information, defined as
nonmarketable indications of interest in the form of quotes or orders, are limited to registered
market makers and ECNs. For any given security, e.g., stock, a registered market maker or
ECN may directly enter a nonmarketable order into the order window 70 on behalf of a
customer or may sponsor the direct entry of an order by its customer. These sponsored,

nonmarketable orders are sent to the market system 20 under the name of the sponsoring market maker or ECN. Each market maker or ECN can submit an unlimited number of nonmarketable quotes to the market system 20. For example, a market maker can submit its entire customer book to buy a stock to the system. This book may have nonmarketable

5   quotes at various price levels. In addition, market makers are permitted to submit both proprietary and agency quotes, whereas, registered ECNs are only permitted to submit agency quotes. Registered market makers would be required to submit at least one proprietary bid and offer, whereas, ECNs have no quote requirement.

        As an example, Market maker 1 MM1 submits to the system 10 six, (6)

10   proprietary bids and agency bids. MM1 can have proprietary bid quotes at 20 for 1,000 shares, 19 7/8 for 1,000 shares and 19 3/4, for 1,000 shares. MM1 can have an internal book filled with customer orders, at three bid price levels, e.g., 20 1/8 for 100 shares, 20 for 200 shares, 19 3/4 for 200 shares. The market marker chooses one of those six bids to advertise. Not every quote is shown in the current quote montage 74. In this example, MM1 can choose

15   to advertise the 19 3/4 quote. Even though the market participants next proprietary bid will be displayed above, it should be advertised below. If MM1 chooses to advertise the quote for 19 3/4 bid and it turns out that 19 3/4 is within the three displayable levels in portion 72, then the advertized quote will also be included in the aggregate 75a.

        Referring to FIG. 7, a format for quotes 80 submitted to the market system 20

20   include a quote size 82, an additional aggregate size 86, and a reserve size 84. In addition, the quotes can include an indication of a willingness to further negotiate 88. This could be a simple window-type i.e., point and click interface where each of these fields can be controls that allow a quoting market participant to enter size and price 90 for quotes at each side of the market. Quote size is the size that is directly attributable to the market maker or ECN when

25   displayed in the current quote montage 74 of the window 70. The current quote montage allows participants to advertize their quotes in an attributable manner to the market. The additional aggregate size is the size in addition to quote size that a market maker or ECN wishes to display to the marketplace through the aggregate display in the upper portion 72 of the window 70, but for which the market maker desires to have it remain anonymous until

30   executed. The aggregate size is likewise stored in the market system 20 and is displayed to the marketplace as part of the aggregate display, but is not attributable to the market maker or

ECN that entered the additional aggregate size. Reserve size is the size that is not displayed to the marketplace, but is immediately accessible through the market system 20. The reserve size is stored in the market system 20 but is not displayed to the marketplace. A willingness to negotiate further can be expressed as a ☐ yes☐ or ☐no☐ or can be inferred by being

5   displayed in the current quote montage 74 of the window 70. A quote in the current quote montage 74 of window 70 requires an order to be delivered for negotiation before moving onto a next price level. The process 40 aggregates only those quotes and orders that are subject to automatic execution. The process 40 aggregates every order and quote it receives at a given price level for a given stock that is accessible by automatic execution. Quote size

10   and additional aggregate size are aggregated together for display, whereas, reserve size is available liquidity accessible through the market system at any given price level but is not displayed. The quotes are accessible by automatic execution and price/time priority. The process 40 separately aggregates agency interest to buy and sell. The process 40 can also separately calculate agency aggregate quotes.

15   As mentioned above, all market makers can execute against the pre-trade information collected in the window 70 by entering a market or marketable limit order. Market and marketable limit orders can be entered either into the top-half 72 of the window 70 to access the aggregate liquidity available or directed to an individual market maker or ECN in the current quote montage 74 of the window 70.

20   The market system 20 can use "point-and-click" window-type technology so that market participants can enter marketable orders by simply clicking on quotes in the window 70. For example, each of the entries in the window 70 can be a control button so that a simple click on the control, e.g, the aggregate shares displayed 75a (FIG. 4) can activate an execution. The click with a mouse or the like at the inside bid in the top-half of the window

25   70 would enter a "default" order priced at the displayed price for the displayed shares. The system would allow a trader to set a "default" number of shares, e.g., 1000 shares. For example, whenever trader clicked on the aggregate shares displayed at the inside bid the trader's system 12 would generate an order for 1,000 shares at the inside price. In addition, a "right-click" on the aggregate display would permit a trader to customize the order at the

30   point of entry.

A market or marketable limit order entered into the aggregate montage 72 of window 70 will be handled in full, one at a time, in the order received. Each marketable order would interact with non-marketable quotes and orders in price/time priority. First, a marketable order would interact with all quote size at a given price, in time priority. The

5 marketable order interacts with all additional aggregate size quotes at a given price in time priority. Finally, an order would interact with all reserve size at a given price level in time priority. Because quote size and additional aggregate size is refreshed, a delay e.g., 15 seconds, may be introduced to preserve time priority once quote sizes have been refreshed.

Once all quote sizes at a given price level have been executed, and before a

10 marketable order is executed at the next available price level, there will be some delay, e.g., 15 seconds. During this period the window 70 is updated to reflect a new inside market (i.e., best bid and best offer). At the same time, the execution system delivers the remainder of an order or the next marketable order in a queue to the market maker with highest time priority who has also expressed a willingness to negotiate with an order. This is an important

15 attribute, because market participants may internalize order flow based on the displayed Best Bid Offer (BBO) and any delay in updating the BBO will force them to execute on a fictional BBO. The BBO is a standardized quote in the securities industry for the national market systems best consolidated quotation, e.g., the best available price to buy and sell.

The market maker who is delivered the order can have three options. The

20 market maker can decline the order, in which case the order would be routed (at the end of the delay period) to market participants bidding at the next highest level. By bypassing the other willing-to-negotiate market makers, this minimizes potential delays in the system and increases the value of time priority. Alternatively, the market maker could fully or partially execute the order at the previous inside price (if it is partially executed, the balance of the

25 order is routed to market participants bidding at the next highest level as above). With another alternative, the market maker could execute the balance of the order at a negotiated price.

Market participants can direct orders to a particular market maker or ECN through accessing the current quote montage 74 of the window 70. Directed orders will not

30 be subject to automatic execution, but rather delivered to a quoting market participant for

execution. The quoting participant will have the option of executing, rejecting, or negotiating with the order, as is commonly done now in the existing Nasdaq market.

Those participants whose quotes are subject to automatic execution and thus included in the aggregate display in the top-half of the window 70 will not be subject to
5   liability orders through the current quote montage 74. Instead, a market participant will be obligated to send to a quoting participant who is subject to automatic execution an order for a minimum acceptable quantity, e.g., at least 100 shares greater than the quoting participant□s Quote Size. A simple click on a quoting participants quote will send this type of order as the default, although a market participant could right click on the quoting participants quote in
10   the bottom half of the window 70 and customize the order at the point of entry.

Other Embodiments

It is to be understood that while the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to
15   illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects, advantages, and modifications are within the scope of the following claims. For example the market process can be used with other products such as goods, commodities, works of art, etc.

20   What is claimed is:

CLAIMS

1.   A method of trading securities comprises:

receiving additional aggregate size quotes for a security.

5   2.   The method of claim 1 wherein receiving further comprises:

receiving quotes that are displayable quotes.

3.   The method of claim 1 wherein receiving further comprises:

receiving quotes that are a reserve quote.

10

4.   The method of claim 2 further comprising:

determining an aggregate quote size for all quotes received for the security.

5.   The method of claim 4 wherein determining aggregate quote size comprises:

15   determining if the quote is a marketable quote;

displaying the displayable quotes.

6.   The method of claim 5 wherein   determining aggregate quote size for
quotes received for the security, comprises:

20   determining if the quote is a marketable or additional aggregate quote type;
and

adding quotes of the marketable and additional aggregate quote type together
to provide a total aggregate quote.

25   7.   The method of claim 5 further comprising;

displaying the marketable quote in a current quote window and additional
aggregate quote in an aggregate window.

8.   The method of claim 1 further comprising:

30   determining if the quote is a proprietary or agency quote.

9.   The method of claim 1 further comprising:

determining if the quote is a marketable or additional aggregate quote type;

determining a price level for the quote; and

adding the quote to all other quotes of the marketable and additional aggregate
quote types at the determined price level to provide a total aggregate quote at the determined
price level.

10.   The method of claim 1 further comprising:

storing the reserve quote.

11.   The method of claim 3 further comprising:

receiving an order; and

executing the order against a quote.

12.   The method of claim 1 wherein the method further comprises:

applying additional aggregate and reserve quotes to any balance of the order to
execute the balance of the order.

13.   An electronic market for trading of securities comprises:

a plurality of client stations for entering quotes for securities; and

a server process that receives quotes from the clients, aggregates quotes and
causes aggregate quotes for a plurality of price levels to be displayed on the client systems.

14.   The electronic system of claim 13 wherein at client stations quotes can be
entered at a price level a quote size that is displayable and attributable to a specific market
participant, a reserve quote size that is neither displayable nor attributable to a specific
market participant, and an additional aggregate quote size that is displayable but not
attributable to a specific market participant.

15.   The electronic market of claim 13 wherein the aggregated quotes are displayed in a graphical user interface that includes an aggregate montage for displaying aggregate quotes at multiple price levels on either side of the market.

5   16.   The electronic market of claim 13 wherein the aggregated quotes include total aggregated interest and agency interest.

17.   The electronic market of claim 13 quotes can be attributable to a specific market participant and are displayed in a current quote montage.

10

18.   A client station for entering quotes for securities comprises:

a graphical user interface on the client at which quotes can be entered at a price level, said interface comprising controls to enter:

a quote size that is displayable and attributable to a specific market participant,
15   a reserve quote size that is neither displayable nor attributable to a specific market participant, and an additional aggregate quote size that is displayable but not attributable to a specific market participant.

19.   The station of claim 18 wherein the interface is an aggregation montage and
20   further includes a current quote montage for displaying attributable quotes.

20.   A graphical user interface for an electronic market for trading products comprises:

an aggregation window which displays additional aggregate quotes for a
25   plurality of price levels of a product traded in the market.

21.   The graphical user interface of claim 20 further comprising a current quote window disposed adjacent the aggregation window.

30   22.   The graphical user interface of claim 20 further comprising:

a current quote window disposed adjacent the aggregate window and wherein said current quote window displays current quotes of participants in the system.

23.   The graphical user interface of claim 20 further comprising:

a current quote window disposed adjacent the aggregate window and wherein said current quote window displays current quotes of participants in the system, and further comprises:

a quote that represents total aggregate quotes at a current market level displayed in the aggregation window.

24.   A computer program product for operating an electronic market for trading of securities comprises instructions for causing a computer to:

receive quotes for securities said quotes at a plurality of price levels and for a plurality of quote sizes; and

5   aggregate received quote into non-attributable aggregated quotes at the plurality of price levels; and

display some of the aggregated quotes at the plurality of price levels.

FIG. 1

40

42 → RECEIVE QUOTES

44 → COMPARE TO EXISTING QUOTES

47 → CURRENT LEVELS

46 → WITHIN PREDEFINED QUOTE LEVELS

NO

YES

52 → STORE QUOTE AT LEVEL

DETERMINE NEW MARKETABLE QUOTE SIZES — 48

DISPLAY NEW PRICE LEVEL

NO

54

EXIT

50 → DISPLAY NEW MARKETABLE QUOTES

CHANGE CURRENT LEVELS DISPLAY NEW LEVELS AND QUOTES AT NEW LEVELS

56

FIG. 2

40'

42 — RECEIVE QUOTES

43 — RESERVE QUOTE

STORE RESERVE QUOTE

MKTB.

44 — COMPARE TO EXISTING QUOTES

47 — CURRENT LEVELS

46 — WITHIN PREDEFINED QUOTE LEVELS

NO

YES

52 — STORE QUOTE AT LEVEL

DETERMINE NEW MARKETABLE QUOTE SIZES — 48

48 — DISPLAY NEW PRICE LEVEL

NO

54

50 — DISPLAY NEW MARKETABLE QUOTES

EXIT

CHANGE CURRENT LEVELS DISPLAY NEW LEVELS AND QUOTES AT NEW LEVELS

56

FIG. 3A

50

60

AGGREG
QUOTE

YES

MKTB.

66

STORE AND
SUM AGGREG
QUOTE

62

ADVERTIZE
QUOTE ?

64

DISPLAY ADVERTIZED
QUOTE IN BOTTOM

FIG. 3B

Bid	Total (75)	Agency (76)		Ask	Total (77)	Agency (78)
$20.00	9,000	5,000		$20.05	0	0	72a
$19.95	15,000	12,000		$20.10	5,000	3,000	72b
$19.90	25,000	11,000		$20.15	15,000	8,000	72c

75a

70, 72, 72

Inside Bid: $20.00 T: 9,000 A: 5,000   Inside Ask: $20.05 T: 1,000 A: 1,000
Last: $20.05 Hi: $20.25 Low: $19.75 PCL: $19.75 Q: -0.30 Vol: 10,500,000

MM1	$20.00	1,000		MM4A	$20.10	300
MM2A	$20.00	1,500		MM2A	$20.10	500
				MM1	$20.15	500
MM2	$19.95	1,000				
MM3A	$19.95	100		MM3A	$20.15	100
MM1A	$19.90	1,000		MM2	$20.15	1,000
MM4	$19.90	1,000		MM4	$20.25	1,000

74

FIG. 4

Bid   **Total**   **Agency**

$20.00   9,000   5,000 →

MM1 $20.00   1,000

MMID	Bid	Quote Size	Aggregated Size	Reserve Size
MM1	$20.00	1,000	3,000	20,000

FIG. 5

70
72
74
80
80
83
84

70

72

74

Bid　　Total　　Agency

$20.00　　| 9,000 |　　| 5,000 | →

	Bid	Quote Size
MM1	$20.00	1,000
MM2A	$20.00	1,500

83

84

80

MMID	Bid	Quote Size	Aggregated Size	Reserve Size
MM1	$20.00	1,000	3,000	0
MM2A	$20.00	1,500	3,500	0

FIG. 6

FIG. 7

[Continued on next page]

(54) Title: MATCH-OFF OF ORDER FLOW IN ELECTRONIC MARKET SYSTEM

(57) Abstract: A market system that includes an internal execution process is described. The system includes an order execution process that receives orders and matches orders against quotes posted in the system on a time priority basis and an order match-off process that checks if a market participant identification associated with a received order matches a market participant identification representing a quote in the system that is at the best bid or best offer price in the system.

WO 01/22263 A2

MATCH-OFF OF ORDER FLOW IN ELECTRONIC MARKET SYSTEM

BACKGROUND

This invention relates to trading systems particularly financial trading systems.

Electronic equity markets, such as The Nasdaq Stock Market® collect, aggregate and display pre-trade information to market participants. In The Nasdaq Stock Market, for example, this pre-trade information takes the form of a quote that represents a single (or an aggregate of same-priced) principal or agency orders. A market such as Nasdaq also provides trading platforms through which market participants may access liquidity indicated in the marketplace.

SUMMARY

According to an aspect of the present invention, a method of executing an order in a market system includes receiving an order from a market participant and for the order, checking if a market participant identification associated with the order matches a market participant identification representing a quote in the system which is at the best bid or best offer price in the system.

According to an additional aspect of the present invention, a market system includes an order execution process that receives orders and matches orders against quotes posted in the system on a time priority basis and an order match-off process that checks if a market participant identification associated with a received order matches a market participant

identification representing a quote in the system that is at the best bid or best offer price in the system.

One or more of the following advantages may be provided by one or more aspects of the present invention.

5   The internal order execution manager tries to match-off a quoting market participant's orders and quotes that are in the system if the participant is at the BBO and receives a market or marketable limit order on the other size of the market. This encourages market

10 participants to give their book of quotes to the market so that their customers can get the best price and best size of execution while insuring market participants that the market will match-off the order flow in their book if the market participant is at the best price.

15

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a block diagram of a market system.

Fig. 1A is a diagram showing a format for quotes.

20   FIG. 2A is a block diagram showing arrangement of an quote/order collector facility.

FIG. 2B is a logic view of functions in the quote/order collector facility.

FIG. 3A is a flow chart showing a quote/order

25 manager.

FIG. 3B is a flow chart showing a montage manager.

FIG. 4 is a flow chart showing an internal execution manager.

30   FIGS. 5A-5B are flow charts of an execution/routing manager.

FIG. 6 is a flow chart showing a quote montage update manager.

FIG. 7 is a flow chart showing a lock/cross manager.

FIG. 8 is a flow chart showing an odd lot execution manager.

FIG. 9 is a diagram that depicts aspects of a composite montage.

DESCRIPTION

Referring to FIG. 1, an electronic market 10 is shown. The electronic market 10 includes client systems 12 that access a central quote/order collector facility 20. The client systems 12 can be broker/dealer systems 12a, electronic communication networks (ECN's) 12b, market-marker systems 12c, and other exchanges 12d. The connections can use existing Nasdaq protocols such as SelectNet®, Small Order Execution System℠ (SOES℠), and so forth. The client systems 12 include a processor, memory and a storage device, e.g., a client workstation or personal computer (all not shown) that can include a client process to enter quotes/orders into the electronic market system. The quote/order collector facility 20 causes the order execution or order delivery systems (e.g., SOES℠ and SelectNet®) to deliver executions or orders to a market that is coupled to a clearing system 16 and a reporting system 18. It also causes delivery of executions or routing of orders to the ECN's 12c, depending on the status of the ECN, and routing of orders to other markets and exchanges 12d. The quote/order collector facility 20 is comprised of one or preferably a

plurality of server computers generally denoted as 22 including a processor 22a, main memory 22b and storage 22c. The storage system 22c includes quote/order collector process 25 that is executed in memory 22b. In
5 general, server 22 is a complex computer server, the details of which are not important to an understanding of the present invention.

The quote/order collector facility 25 collects pre-trade information in the form of quotes or orders.
10 The distinction between a quote and an order depends on several factors. For example, each a market maker can send a proprietary quote i.e., a quote that represents its own trading interest or an agency quote that represents trading interest of a sponsored entity. If
15 one proprietary quote is sent it could be considered one order. If one agency quote is sent it also could be considered one order. If an agency quote reflects an aggregation of more than one agency order, however, the aggregate agency order could be considered a quote.
20 Entering quotes are limited to registered market makers 12b and ECNs 12c and possible UTP Exchanges 12d. For any given stock, a registered market maker or ECN may directly enter a non-marketable order i.e., quote into the system 20 on behalf of its customer account, or it
25 may sponsor the direct entry of an order by its customer. All sponsored, quotes are sent to the quote/order collector facility 20 under the name of the sponsoring market maker or ECN. Every registered market maker or ECN will be permitted to submit an unlimited number of non-
30 marketable quotes to the system 20.

As shown in FIG. 1A, each quote 19 submitted to the system can included a display quote size 19a, a

reserve size 19b and an indication 19c (ATTR) of whether the quote size is attributable or non-attributable. Quote size 19a when attributable based on indicator 19c, is directly attributable to the market maker or ECN and is

5 displayed in an "current quote" montage an order display window 200 to be discussed below in FIG. 9. Quote size 19b when non-attributable is size that the market maker or ECN wishes to display to the marketplace through an aggregate montage of the order display window 200

10 discussed below in FIG. 9. This quote size 19a is not attributable to the market maker or ECN until it is executed. Reserve size 19b is size that is not displayed to the marketplace but that is immediately accessible through the quote/order collector facility 20. In order

15 to use reserve size 19b, a market maker can be required to have a minimum amount displayed in the aggregate quote size 19a without attributable indicator 19c and negotiation quote with attributable indicator 19c asserted.

20 The current quote montage 204 of the window 200 without agency quotes is similar to the long existing Nasdaq display montage, whereas the current quote montage 204 with the agency quotes as depicted in FIG. 9 is similar to that shown in U.S. Patent Application Serial

25 No. 09/208,942, filed on December 12, 1998 entitled "DUAL QUOTE MARKET SYSTEM" by Richard G. Ketchum et al. and assigned in part to the assignee of the present invention.

A broker/dealer can receive an order from a

30 customer. The broker/dealer can send that order to the order collector facility 20 to be executed with quotes that are posted by electronic communication networks,

market makers or other markets. In this embodiment, orders of broker/dealers are not posted as quotes.

ORDER COLLECTOR FACILITY

Referring to FIG. 2A, the quote/order collector facility 20 receives quotes, liability orders, (non-liability orders) and directed orders from market participants. The quote/order collector facility 20 allows a quote/order to be displayed in the market, and also allows for marketable orders to be executed or routed to market participants.

The order quote collector facility 20 also includes an interface 21 that couples the order collector facility 20 to a plurality of order delivery systems. For example, the interface 21 can couple the order quote collector facility 20 to an order execution system, e.g., the Small Order Execution System^{SM} (SOES^{SM}) and to a negotiation system, e.g., SelectNet®. The interface 21 would provide access to information contained in order flow delivered via the delivery systems to a quote/order collection process 25 described in conjunction with FIG. 2B. In general, the electrical and logical functions which comprise the interface 21 can be similar to the ones currently existing in the SOES^{SM}/SelectNet® systems. The interface 21 or the process 25 would extract information from the quotes and make that information available to the quote order collector process 25. The quote/order collector process 25 extracts information and process orders in a unified manner to allow the order collector system 20 to be a unifying point of collection of all orders which are sent to the market 10.

The interface 21 can also be used to route executions of liability orders back to market participants whose quotes/orders were executed against and can deliver orders for negotiation against market

5   participants whose quotes are selected for further negotiation via the SOES℠ and SelectNet® systems.

Referring to FIG. 2B, the quote/order collector process ("OCP") 25 is shown. The quote/order collector process 25 provides transmission of multiple orders or

10 quotes at multiple price levels by Quoting Market Participants to a quotation manager 26a. The quote/order manager 26a that provides a unified point of entry of quotes and orders from disparate delivery systems into the quote/order collector facility 20 to access

15 quotes/orders displayed (as either attributable or non-attributable) in both the aggregate montage and current quote montage. The quote/order manager 26a manages multiple quotes/orders and quotes/orders at multiple price levels and uses a montage manager 26b to display

20 (either in the Aggregate montage or in the current quote montage) the orders/quotes consistent with an order's/quote's parameters. The order collector process 25 also includes an internal execution process manager 26c to match off executions for quoting market

25 participants at the best bid/offer. The order collector system 20 also includes an order routing/execution manager 26d provides a single point delivery of executions or routing of orders, which substantially eliminates potential for dual liability. That is, order

30 collector process 25 will maintain the order routing and executions functionality available in the SOES℠ and SelectNet® systems. The order collector process 25 also

includes a quote update manager 26e, a lock/cross quote manager 26f, and an odd lot execution manager 26g.

Referring to FIG. 3A, the order collector process 25 receives orders/quotes and time stamps 42 each
5   order/quote upon receipt. This time stamp determines the order's/quote's ranking for automated execution. Quotes/orders are designated as either attributable or non-attributable, and could also have a reserve size discussed above. The order collector process 25
10 aggregates all of a Quoting Market Participant's attributable and non-attributable orders at a particular price level, and disseminates order/quotation information into the aggregate montage and/or the current quote montage, as will be discussed below.

15 The order entry process 25 determines 43 whether the received quote/order corresponds to a reserve quote. If the quote does not corresponds to a reserve quote then the quote is a displayable quote that is attributable or non-attributable. The order entry
20 process 25 compares 44 the received quotes/orders to existing quotes/orders to determine 46 whether the price of quotes/orders fall in existing quote/order price levels. Any number of quote/order price levels can be accommodated although in this example, only three price
25 levels will be displayable in the non-attributable i.e., aggregate montage. If the quote price is in a displayable price level it is a displayable quote eligible for automated execution. The order collector system 20 can be provided with more price level depth
30 than the three levels, e.g., a depth of 20-25 levels although only a limited number, e.g., three would be displayed at any one time.

If the quote is within one of the pre-defined quote levels, the process 25 determines 48 new non-marketable quote/orders sizes by adding the quote/order size corresponding to the received quote/order to quote sizes at that price level already in the system 20. The process 25 will cause the new non-marketable quote sizes to be displayed 50. If the quote is not within one of the pre-defined quote levels, the process 25 stores 52 the quote at a new price level determines 54 if it is at a better price. If the quote is at a better price, the process 25 changes 56 current levels to cause a new price level for non-marketable quote sizes to be displayed 50.

Referring to FIG. 3B, the montage manager 26b of the quote/order collector process 25 determines 60 which price levels to display 60 and determines 61 if an order is a non-attributable order. If the order is non-attributable, the quote/order collector process 25 will store and sum 66 the quote with like quotes to produce an aggregated quote and display 68 the aggregate size of such orders in the aggregate montage when the orders fall within one of the three top price levels. For attributable orders, the aggregate size of such orders is displayed in the current quote montage once the order(s) at a particular price level becomes the particular quoting market participant's best attributable bid or offer in the current quote montage. This interest will also be aggregated and included in the aggregate montage if it is within the displayed price levels. Market makers and ECNs can have one MMID and possibly an agency MMID against which they can display attributable quotes. If a market maker has an agency quote, attributable orders will be displayed once the order or orders at a

particular price level become the market participant's best agency quote.

For example, MMA sends system 20 five 1,000 shares attributable buy orders at $20 and two 1,000 share non-attributable buy orders at $20, for a total interest of 7,000 shares to buy at $20. At some point, the $20 price level becomes the best bid. In this example, if MMA is alone at the inside bid, system 20 will aggregate all of the orders in the system and display as follows: 7,000 shares in the Aggregate montage; 5,000 shares (the attributable portion) in the current quote montage next to MMA's MMID; and 2,000 (the non-attributable portion) in a "SIZE" MMID.

Quote/order collector system 20 provides several advantages to the market. One advantage is that it ensures compliance with the regulatory rules such as the SEC Order Handling Rules, and in particular the Limit Order Display Rule and SEC Firm Quote Rule. With system 20 it is less likely that a Quoting Market Participant, because of system delays and or/fast moving markets, will miss a market because the Quoting Market Participant is unable to quickly transmit to System 20 a revised quote (which may represent a limit order).

ECNs do not currently participate in the SOES^{SM} execution system because of the potential for dual liability and assuming proprietary positions. For example, if an ECN matches orders between two subscribers and contemporaneously receives an execution from SOES^{SM} against its quote, the ECN will be required to honor both the internal execution and the SOES^{SM} execution, thus taking on a proprietary position. This issue of liability does not arise in SelectNet® because that

system delivers orders which can be declined if the ECN, after scanning its book, determines that the quote was taken out by an internal execution. An ECN cannot decline a SOES^{SM} execution because the system delivers an

5   execution, as opposed to an order.

An ECN, like a market maker, can have the ability to give orders to the system 20. If an internal subscriber wants to access an order in an ECN that is also being displayed in system 20, the ECN can request a

10   cancel before effecting the internal match, as discussed below in FIG. 4. If the request to cancel is declined because the order was already executed against in system 20, the ECN can decline the internal customer and avoid the potential for dual liability.

15   Referring now to FIG. 4, the internalize execution manager 26c is shown. Another benefit of the system 20 is that when Quoting Market Participant is at the best bid/best offer, internalize execution manager 26c matches-off a participant's agency or proprietary

20   orders against that participant's quotes/order before the order is sent for time/price priority execution in the quote/order collector facility 20. Quoting Market Participants encounter difficulties in managing their book because Quoting Market Participants may transmit

25   only a single quote (which may represent a single order or an aggregate of proprietary/agency interest at a single price).

For example, if MMA sends system 20 all of its quotes/orders and is at the best bid of $20 showing 4,000

30   shares (attributable and non-attributable), and the MMA sends OCF 25 a 1,000 share market sell order from one its customers, OCR 25 will examine 67a the identification of

the order and if it matches the identification of the market participant who is at the best bid or offer for that security, the OCP 25 will execute 67b the order against the participant's own quote, thus matching off the

5 order on behalf of the participant. The OCP 25 can call 67c a "request a cancel" function where a Quoting Market Participant can request cancellation of an order from system 20 before the order is actually executed. The request to cancel feature, along with the ability to

10 leave orders with system 20, will benefit ECNs by allowing them to participate in automatic execution and the internalized execution process 67 described above while minimizing the potential for double liability or taking on a proprietary position.

15 Currently, to access quotes via automatic execution, a market participant may enter an order into its SOES^SM system if the order is for a public customer and meets maximum order size requirements. A market participant may use SelectNet® if an order is not SOES^SM

20 eligible, if the market participant wishes to access a quote of an ECN or UTP Exchange, or if the market participant wishes to use the negotiation features of SelectNet®. However, SOES^SM and SelectNet® are not integrated and operate in an asynchronous manner.

25 In a preferred embodiment of the order collector facility 20, the SelectNet® system is used as a negotiation system and specific changes are made to the SOES^SM system. The two systems can continue to operate on separate platforms. From an end-user's perspective, a

30 market participant will still have to operate and manage two separate systems. For example, market participants will have to first determine the type of order they wish

to enter (liability v. non-liability) and/or to whom they wish to send the order (market maker, ECN, UTP Exchange), and then decide which system (SOES℠ or SelectNet®) to use to enter the order.

5   SOES℠ and SelectNet® are configured to minimize the potential for dual liability, as described in copending patent application Serial No.   filed entitled DELIVERY SYSTEM FOR ORDERS IN AN ELECTRON MARKET which is incorporated herein by reference. In that
10 application, to minimize the potential for dual liability (e.g., receipt of a Liability Order followed immediately by the delivery of an execution against a market maker's quote), the SelectNet® system is configured so that only a non-Liability Order could be delivered to those market
15 participants who participate and are subject to automatic execution. To send a Liability Order to a market maker, a market participant would use the system to route the order to the next market maker in a queue. Market participants would still use SelectNet® to access quotes
20 of ECNs that do not participate in SOES℠ and to direct non-Liability Orders to a particular market maker. The SOES system is also reconfigured to an automated facility for the handling of all market traded orders of less than a predetermined number of shares, e.g., 9,900 shares.
25 The orders can be entered for execution against an expanded trading interest accessible through both displayed (and reserve size quotes described below).

        The OCF 20 will eliminate virtually all potential for double liability using the disparate
30 delivery systems because OCF 20 will serve as the single point of order entry and the single point of delivery of all Liability Orders (as well as Non-Liability Orders).

-13-

To access quotes in system 20, therefore, order entry firms, market makers, ECNs, or UTP Exchanges, will enter either a directed or non-directed order into the OCF 25. The order may be of any size. The order

5 indicates whether it is a buy, sell, sell short, or sell short exempt. The order is either a priced order or a market order. The system 20 has a separate odd lot process described below.

10 Nondirected Orders

A market participant can immediately access the best prices in system 20 as displayed in the aggregate montage, by entering a non-directed order into the OCF 25. A non-directed order, is an order that is not

15 sent/routed to a particular Quoting Market Participant. A non-directed order is designated as a market order or a marketable limit order and is considered a "Liability Order" and treated as such by the receiving market participant. If a non-directed limit order is

20 marketable when entered into the system but subsequently becomes non-marketable because of a change in the inside market, the system will hold the order for e.g., 90 seconds and not immediately return the order to the participant. If within the 90 seconds the order once

25 again becomes marketable, the system will send the order to the next Quoting Market Participant in queue. Additionally, the order entry participant can obtain the status of the order and request a cancel of such order.

Upon entry, the OCF 25 will ascertain what

30 market participant is the next Quoting Market Participant in queue to receive an order, and depending on how that receiving Quoting Market Participant participates in

- 14 -

system 20 (i.e., automatic execution v. order delivery), the OCF 25 will either cause delivery of an execution (via SOES^{SM}) or delivery of a Liability Order (via SelectNet®).

5   For example, if MMA and ECN1 (non-automatic exception participant) are at the inside bid each displaying 1,000 shares at $20, and OE Firm A enters a market order to buy 1,000 shares, assuming that MMA is first in time priority, the OCF 25 will route the order

10   into the SOES^{SM} and deliver an execution of 1,000 shares to MMA via the SOES^{SM}. If another market order to buy 1,000 shares is entered into the system, the OCF 25 will deliver an Liability Order to ECN1. If ECN1 had opted to take automatic execution, the OCF would had delivered an

15   execution to ECN1 via the SOES^{SM}.

Order Execution Manager

          Referring to FIGS. 5A-5B, the order execution/routing manager 26d is shown. The order

20   execution/routing manager 26d will execute non-directed orders against Quoting Market Participant's quotes/orders based on price/time priority. As noted above, each quote/order when entered into the OCF 25 receives a time stamp. The order execution/routing manager 26d will

25   deliver all orders at the best bid/best offer in strict time priority based on the time stamp of the order/quote, with the exception that order execution/routing manager 26d will first attempt to provide a match off of orders/quotes entered by a Quoting Market Participant if

30   the participant is at the best bid/best offer by calling the internal execution manager 26c (FIG. 4). Thus, the order execution/routing manager 26d will call the

internal order execution manager 26c to try to match off a Quoting Market Participant's orders and quotes that are in the system if the participant is at the BBO and receives a market or marketable limit order on the other

5   size of the market.

The order execution/routing manager 26d will attempt to execute 76 against all displayed size (attributable and non-attributable) at a particular price level for market participants such as market makers and

10 ECN's. There does not need to be an interval delay between the delivery of executions against a market maker's quote (assuming the market maker has size to access) because all Quoting Market Participants may quote their actual size and may give multiple orders and price

15 levels. As shown herein the market maker proprietary orders receive preference over agency orders. However, preference could be given to agency orders before market maker orders.

Once displayed size in system 20 is exhausted,

20 the order execution/routing manager 26d will attempt to access the quotes of UTP Exchanges. After accessing the displayed size of Quoting Market Participants and UTP Exchanges 78, order execution/routing manager 26d will attempt to execute against the reserve size of Quoting

25 Market Participants in price/time priority.

In an alternate embodiment, the order execution/routing manager 26d can distinguish between exchanges that support auto execution and exchanges that do not support auto execution giving preference for the

30 former. Additionally, in such an embodiment, UTP exchanges can have reserve size and the system 20 can distinguish between exchanges that support auto execution

and those ECN's, and then exchanges that do not support auto execution.

In another embodiment the order execution/routing manager 26d can first access quotes of market makers and auto-execution ECN's, next access quotes of market makers and ECN's for delivery of orders, then the reserve size of market makers and ECN's and UTP exchanges.

Referring to FIG. 5B, if the order is not filled 88, the order execution/routing manager 26d will move 90 to the next price level, after a predefined delay, e.g., a 5 second interval delay 87 before attempting to execute an order at the new price level. The price-level interval delay will give market participants time to adjust their quotes and trading interests before the market moves precipitously through multiple price levels, which may occur when there is news, rumors, or significant market events. Thus, the price-level interval delay is a modest and reasonable attempt to limit volatility.

Directed Orders

The current quote montage allows Quoting Market Participants to advertise their buying or selling interest. To access a specific quote in the current quote montage, a market participant will enter into the OCF 25 a "directed order" to begin the negotiation process with a particular Quoting Market Participant. A directed order is one that is routed by the market participant entering the order to a specific MMID. To limit the possibility for dual liability, a directed order must be designated as: 1) All-or-None ("AON") and at least 100

shares greater than the size of the displayed quote of
the market participant to which the quote is directed;
or 2) a Minimum Acceptable Quantity order ("MAQ") with an
MAQ value of at least 100 shares greater than the
5   displayed amount of the quote of the participant to which
the order is directed. If a Quoting Market Participant
is at the inside or displaying (attributable or non-
attributable) interest in the montage and receives a
directed, non-Liability Order that the participant wishes.
10 to fill, to avoid double liability the Quoting Market
Participant may "request a cancel" of its displayed
quote/order in System 20 before it fills the non-
Liability Order. System 20 will not decrement a quote
upon the delivery of a non-Liability Order.
15   Referring to FIG. 6, a quote update process in
the quote size manager 26e is shown. If an execution is
delivered to a Quoting Market Participant that accepts
automatic executions 102 (i.e., market makers or ECNs
that choose to accept automatic executions via the
20 SOES^{SM}), quote size manager 26e will automatically
decrement 104 the aggregate quote in the aggregate
montage by the size of the incoming order, and the
Quoting Market Participant's quote in the current quote
montage if the quote/order is attributable. For Quoting
25 Market Participants who accept automatic execution, if
the participant's displayed size is decremented to zero
106, the Quoting Market Participant's displayed
(attributable or non-attributable) size will be
replenished from reserve if the market participant has
30 reserve size by calling 108 an auto quote refresh.
        If an ECN accepts automatic execution via SOES^{SM}
and has its quote exhausted to zero 111 without update or

without transmission of another attributable quote/order, quote size manager 26e will zero out 114 the one side of the quote that is exhausted. If both the bid and offer size of the ECNs market is reduced to zero without update

5   or transmission of another attributable quote/order, the ECN will be placed into an excused withdrawal 116 and restored once the ECN transmits revised quotes.

For Quoting Market Participants that do not participate in automated execution, e.g., ECNs that opt

10 out of automatic execution and UTP Exchanges that only participate in order delivery, the execution manager 26d will deliver a Liability Order of a size that is equal to or less than the participant's quoted size. System 20 will automatically decrement 120 the participant's 122

15 quote by the size of the order delivered, but quote size manager 26e will move the participant to the bottom of the queue and not deliver another order to such Quoting Market Participant until the Quoting Market Participant has processed the order by providing a complete or

20 partial fill of the order. If such Quoting Market Participant declines or partially fills the order, System 20 will send the order (or remaining portion thereof) back into the queue for delivery to the next available Quoting Market Participant. In addition, if the Quoting

25 Market Participant declines or partially fills the order, or if the participant fails to respond in any manner within 10 seconds of order delivery, System 20 will presume equipment failure and will take corrective action.

30 For ECN's, quote size manager 26e will zero out that side of the ECN's market, and for UTP Exchanges quote size manager 26e will place the participant at the lowest

bid and highest offer price for a trading unit e.g., 100 shares until updated. This is necessary to ensure that Quoting Market Participants that do not provide timely executions due to equipment or other failures do not hold

5   up the market and cause queuing of orders within the system 20. As noted previously, market makers will be required to maintain a two sided, attributable proprietary quote (other than its Agency Quote) in system 20 at all time. To assist with this requirement, market

10 makers will be able to use the AutoQuote Refresh ("AQR") process that is available in the SOES^SM.

When a market maker's proprietary quote (both displayed and reserve) is exhausted to zero, the system will refresh the market maker's price on the bid or offer

15 side of the market, whichever is decremented to zero, by an interval designated by the market maker and the market makers size to a level designated by the market maker. When the market maker's quote is refreshed, however, the AQR will refresh the market maker's attributable

20 quote/order (not the non-attributable quote). AQR will not be available for Agency Quotes. Additionally, if a market maker does not use AQR but otherwise has another attributable proprietary quote in System 20, System 20 will automatically display the market maker's next best

25 attributable proprietary quote when its current attributable quote is exhausted.

If a market maker's quote is decremented to zero and does not update its non-agency quote via AQR, transmit a revised attributable quote to System 20, or

30 have another proprietary attributable quote/order in System 20, System 20 will place the market maker's quote (both sides) in a closed state for a short period of

time, e.g., three minutes. At the end of that time
period, if the market maker has not on its own updated
its quote or voluntarily withdrawn its quote from the
market, System 20 will refresh the market maker's
5   quotation to 100 shares at the lowest market maker bid
and highest market maker offer currently being displayed
in that security and reopen the market maker's quotation.

Locked/Crossed Markets

10   Referring to FIG. 7, a lock/cross manager 26f
is shown. With the lock/cross manager 26f, locked and
crossed markets, can be virtually eliminated.
Specifically, if a Quoting Market Participant enters a
quote 132 that would lock or cross the market 134, the
15   lock/cross manager 26f will not display the quote as a
quote, but instead the lock/cross manager 26f will format
the quote and treat it as a marketable limit order 136
and enter the reformatted order into the OCF 25 as a non-
directed Liability Order for execution in time priority.
20   In a locked market situation 137, the orders will be
routed 138 to the Quoting Market Participant(s) next in
queue whom would be locked, and the order will be
executed 140 at the price of the locking quotes/orders.
For crossed market situations 137, the crossing order
25   will be entered 142 into the system and routed to the
next Quoting Market Participants in queue, and the order
will be executed at the price of the displayed quote that
would have been crossed. Once the lock/cross is cleared,
if the Quoting Market Participant's order is not
30   completely filled 146, the lock/cross manager 26f will
reformat the remainder of the order and cause it to be
displayed 148 as a quote on behalf of the entering

Quoting Market Participants. If the market moves and the order no longer is locking/crossing, the lock/cross manager 26f will return the order and format it as a quote for display in System 20.

5   For example, the inside market is $20 bid, $20 1/16 offer, bid size 1,000 by 1,000 offer, and MMA is at the inside bid. If MMC attempts to enter into the system an offer quote of $20 for 4,000 shares, the OCF 25 will format MMC's quote as an order, route it to MMA (assuming

10   MMA is first in queue and there are no other marketable orders in queue ahead of MMC's quote/order), and execute MMC's order against MMA's quote at $20 for 1,000 shares. If the next market participant on the bid side is quoting at $19 15/16 and since there are 3,000 shares remaining

15   in MMC's order, the OCF will reformat the remaining portion of the order and display it as a quote (consistent with the order's parameters), thereby establishing a new inside of $19 15/16 bid and $20 offer.

       As a second example, if MMC attempts to enter

20   into the system an offer quote of $19 15/16 for 1,000 shares when MMA is at the best bid of $20, the system will format MMC's quote as an order, route it to MMA, and execute MMC's order against MMA's quote a $20, 1,000 shares, thus giving price improvement to MMC's order.

25   If the market is locked or crossed at the opening, system 20 will attempt to clear out the locked and/or crossed quotes, and then will begin processing market and marketable limit orders that are in queue.

30 UTP Exchange Participation

       National securities exchanges trading pursuant to grants of unlisted trading privilege ("UTP") can enter

orders into the OCF 20. UTP Exchanges will receive, and be obligated to execute, Liability Orders or may provide auto execution to incoming orders if they so choose. Specifically, when a UTP Exchange is next in queue to
5 receive a Liability Order, System 20 will deliver a non-directed order to the UTP Exchange.

Additionally, if a UTP Exchange wishes to access the best market, the UTP Exchange may enter a non-directed Liability Order into the OCF. The OCF will send
10 the next market participant an order for delivery, not automatic execution, regardless of whether the Quoting Market Participant participates in automatic execution. This is similar to the manner in which NASD market makers in the third market are accessed and may access other
15 market centers. UTP Exchanges will also be able to direct non-Liability Orders for negotiation to particular market makers. Finally, UTP Exchanges will only be able to submit attributable quotes, and will not be able to utilize reserve size or AQR.
20

ECN Participation

ECNs will have the choice of taking order deliver or participating in automatic execution. Regardless, ECNs in System 20 will have full access to
25 the OCF 25 for order entry and order delivery and will be able to designate orders/quotes as attributable/non-attributable, have a reserve size, and be able to transmit multiple quotes/orders at multiple prices.

30 Odd-Lot Processing

Referring to FIG. 8, an odd lot execution manager 26g is shown. The odd lot execution manager 26g

will accept and execute orders less than one normal unit of trading, i.e., odd-lot orders or orders less than one round lot (i.e., 100 shares for equities). The odd lot execution manager 26g is a separate mechanism for
5 processing and executing these orders as distinct from normal units of trading. Odd lot execution manager 26g will detect 164 and hold 166 odd-lot orders in a separate file and automatically execute 170 such odd-lots against market makers 177 in round robin rotation whenever the
10 odd-lot order becomes marketable, i.e., when the best price in the system moves to the price of the odd-lot limit order. For example, if a member enters a market order for 50 shares into the system, odd lot execution manager 26g will immediately and automatically execute
15 the order at the inside price against the market maker that is first in rotation for execution of such orders, regardless of the market maker's quoted price. The odd lot execution manager 26g will not decrease the market maker's displayed size. Additionally, if a mixed lot is
20 entered into the system, to ensure continuity of price, once the round-lot portion is executed, the odd-lot portion will be executed against the next market maker in rotation at the round-lot portion price.

25 Small Capitalize Stocks

The system 20 could use the expanded SOES℠ system and the aggregation montage for all securities, including Small Capitalize Stocks (SmallCap). This would eliminate the need to have separate systems for those
30 listed securities.

Montage

Referring to FIG. 9, the system uses a composite montage 200. One component of the composite montage is the current montage 204 that exists in the current NWII presentation. The current montage 204 has into two primary display components. One component 205 is the Market Minder Window, which allows market participants to monitor price activity (inside bid/offer and last sale) of selected stocks, and the Dynamic Quote window, which shows for a particular stock the inside bid and offer, the last sale, change in price from previous close, daily high and low, volume, and the short sale arrow indicator. The other component is current quote montage 204. The current quote montage 204 shows for a particular stock two columns (one for bid, one for ask), under which is listed the MMIDs for each registered market maker, ECN, and UTP Exchange in the particular stock and the corresponding quote (price and size) next to the MMID. System 20 ranks the bids and offers along with the corresponding MMID in price/time priority. Accordingly, the market participant at the best bid who is first in time appears first in the montage, the market participant at the best bid (or the next best bid) who is next in time is ranked second, and so forth.

Market makers are required to submit a two sided proprietary quote, and ECNs that participate in System 20 may submit a one or two sided quote. UTP Exchanges that have an interface with System 20 are required under the UTP Plan to submit to System 20 a two sided quote, which represents the exchange specialist's best quote in the stock at issue. While a market maker's quoted price and size is attributed to the market maker

by the corresponding MMID, this may not represent the market maker's best price if the market maker has placed a better priced order into an ECN that complies with the Display Alternative Rule. Accordingly, a market maker

5 may be displaying in the current quote montage a proprietary bid of $20 when the market is $20 1/8 to 20 ¼, but the market maker may be displaying in a qualifying ECN a bid of $20 1/16. The $20 1/16 quote may only be seen by subscribers of the ECN in which the market maker

10 has placed the order and is not visible to the system 20 or market participants unless and until $20 1/16 becomes the best bid in the ECN.

Montage With Enhanced Display of Trading Interest

15   Still referring to FIG. 9, as mentioned above the quote/order collector facility 20 operates with a composite montage that is sent to participant workstations as a graphical user interface. The composite montage 200 includes the current quote montage 204 and

20 aggregate montage 202. The aggregation montage 202 displays a predetermined number of price levels, e.g., the three best price levels 202a-202c on both the bid and offer side of the market. Each price level 202a-202c generally is dynamically updated and provides a display

25 of the aggregate size of "displayed" trading interest ("attributable" and "non-attributable," as explained above) at each price level for both sides of the market e.g., 205, 207.

        Referring back to FIG. 1A, the entry format 80

30 for quotes/orders includes a quote size field 182 and a reserve size field 184. Quoting Market Participants will be able to designate a quote/order as "attributable" or

"non-attributable," by an entry in field 186. Both attributable and non-attributable orders are considered "displayable orders" since they are displayed to the system 20 and have the potential for being viewed by market participants. If a quote/order is "attributable," the price and size of the order will be displayed next to the Quoting Market Participant's MMID in the current quote montage (assuming this is the Quoting Market Participant's best priced attributable quote/order), and will also be displayed in the aggregate montage as part of the aggregate trading interest when the price of the quote/order is within the best three price levels.

Alternatively, if a Quoting Market Participant designates an order/quote as "non-attributable," it will be displayed in the aggregate montage as part of the aggregate trading interest when the price of the quote/order is within the best three price levels, but will not be displayed in the current quote montage next to the Quoting Market Participant's MMID. The non-attributable order/quote of the quoting market participant will be displayed in the "SIZE" quote if it is in the best non-attributable quote/order on that side of the market.

Thus, Quoting Market Participants can display trading interest to the market anonymously, without attribution to its MMID, and still be in compliance with SEC Rules. Specifically, market makers will be required to publish in the current quote montage a two sided quote that is attributed to it by MMID. System 20 should satisfy the Display Alternative requirements. That is, if a market maker displays in the aggregate montage a non-attributable proprietary or agency interest that is

priced better that its attributable quote/order in current quote montage, this would be consistent with SEC Rules because the better priced non-attributable quote/order will be displayed in System 20 once it is at

5   the best bid/best offer or two price levels away. Additionally, the prices in the aggregate montage will be accessible through traditional execution systems, thus providing equivalent access to the quote.

If a market maker were to place an order into a

10   qualifying ECN, that order would not be displayed in System 20 until it was at the top of the ECN's file. In system 20, however, the market maker's order in the aggregate montage will be displayed when it is within the best three price levels on either side of the market.

15   Thus, the aggregate montage reduces fragmentation and increases transparency in that orders that might not be displayed to the market because they are in an ECN and not at the top of the ECN's book, may now be displayed in System 20. Additionally, system 20 will display in the

20   current quote montage only one MMID (two sided) and one Agency MMID (one or two sided) for each market maker, and one MMID per ECN. Thus, it would be consistent for a market maker to send system 20 a non-attributable proprietary or agency quote/order that is priced better

25   than its attributable quote in the current quote montage. It would also be consistent for a market maker that receives a limit order, which is priced better than the market maker's attributable quote in the aggregate montage, to designate that limit order as non-

30   attributable and display it only in the aggregate montage without updating its quote in the current quote montage). This arrangement and treatment of the order must be

consistent with the market maker's best execution obligations and understanding with the customer.

A Quoting Market Participant may indicate that a quote/order has reserve size. Reserve size will apply to a market maker's proprietary as well as Agency Quote, and the market maker must be displaying (either as attributable or non-attributable) 1,000 shares. Reserve size will replenish displayed size (attributable only or non-attributable) by at least 1,000 shares (or a default amount) once displayed size is decremented to zero. Reserve size along with displayed (both attributable and non-attributable) size, will be accessible through system 20. Reserve size, however, will not be displayed in either the aggregate montage or the current quote montage. As described above, system 20 will access reserve size after all displayed size is exhausted.

The current quote montage 204 also includes a special MMID (here referred to as "SIZE") that represents the aggregate size of all non-attributable quotes/orders at the best bid/best offer displayed in the current quote montage 204 along with the other MMIDs for the Quoting Market Participants displaying attributable size at the inside. There is one "SIZE" MMID for the bid and offer side of the market. The aggregate size of the best bid/best offer displayed in the aggregate montage will equal the sum of the SIZE MMID displayed and the individual sizes of the MMIDs at the best bid/best offer displayed in the current quote montage. The "SIZE" MMID is provided to properly calculate and disseminate the System 20 best bid and best offer ("BBO") along with the accompanying market center, e.g., for a national quotation service.

System 20 provides a "Summary Scan" function as part of the aggregate montage. The Summary Scan function is a query function that can provide information at the total displayable size (attributable and non-
5 attributable) for all levels below the three displayable price levels in the aggregate montage. The Summary Scan anonymously displays interest (attributable and non-attributable) at each price level on both sides of the market, but is not dynamically updated.
10 The current quote montage represents all trading interest that a Quoting Market Participant wishes to attribute to its MMID. This section may be viewed as a way for Quoting Market Participants to advertise their trading interests, which may be at the inside market or
15 one or more ticks away. The current quote montage 204 will be useful for market participants who wish to trade a block or large size at a price that is one or more ticks away from the market. The aggregate montage will allow Quoting Market Participants to display size to the
20 market anonymously, which minimizes certain risks that a market participant encounters when large size is attributable to its MMID. By allowing for the anonymous display of size to the market and by providing a facility that is SEC Order Handling Rule compliant, the aggregate
25 montage will encourage Quoting Market Participants to show greater size, which will increase transparency. Finally, reserve size benefits the market by allowing market participants to provide to system 20 back book trading interest, but not the market in general. This
30 feature will minimize potential market impact of displaying very large size, while enhancing liquidity since reserve size will be electronically accessible.

The system 20 can use "point-and-click" window-type technology so that market participants can enter marketable orders by simply clicking on quotes in the window 200. For example, each of the entries in the

5 window 200 can be a control button so that a simple click on the control, e.g, the total shares displayed 205a (FIG. 4) can activate an execution. The click with a mouse or the like at the inside bid in the top-half of the window 200 could enter a "default" order priced at the

10 displayed price for the displayed shares. The system 20 would allow a trader to set a "default" number of shares, e.g., 1000 shares. For example, whenever trader clicked on the aggregate shares displayed at the inside bid the trader's system 12 would generate an order for 1,000

15 shares at the inside price. In addition, a "right-click" on the aggregate display would permit a trader to customize the order at the point of entry.

Other Embodiments

20 It is to be understood that while the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended

25 claims. Other aspects, advantages, and modifications are within the scope of the following claims.

What is claimed is:

-31-

CLAIMS

1.   A method of executing an order in a market system comprises:

5   receiving an order from a market participant; and

for the order, checking if a market participant identification associated with the order matches a market participant identification representing a quote in the

10   system which is at the best bid or best offer price in the system.

2.   The method of claim 1 further comprising: matching-off the order against the one of the

15   best bid or best offer that is at the opposite side of the market.

3.   The method of claim 1 further comprises: matching-off the order without regard to a time

20   priority of other quotes in the system, against the one of the best bid or best offer that is at the opposite side of the market.

4.   The method of claim 1 further comprising:

25   calling a cancel request to cancel a quote at the side of the market in which a matched off order will be executed.

5.   The method of claim 1 further comprising:

30   calling a cancel request prior to matching off the order to cancel a quote at the side of the market at which an matched off order will be executed.

6.   The method of claim 1 further comprises routing the order to a market participant corresponding to said participant that has the one of the best bid or best

5   offer that is at the opposite side of the market.

7.   The method of claim 1 wherein the order received from the market participant is checked against proprietary quotes and agency quotes of said market

10 participant.

8.   The method of claim 1 further comprising:
        receiving the internal book of the market participant to match-off against the market participant's

15 posted agency or proprietary quotes.

9.   The method of claim 1 wherein receiving an order from a market participant further comprises:
        receiving the order from the market participant

20 via an order execution system.

10.   The method of claim 1 wherein receiving an order from a market participant further comprises:
        receiving the order from the market participant

25 via a negotiation order entry system.

11.   A market system comprises:
        an order execution process that receives orders and matches orders against quotes posted in the system on

30 a time priority basis;
        an order match-off process that checks if a market participant identification associated with a

received order matches a market participant
identification representing a quote in the system that is
at the best bid or best offer price in the system.

5   12.   A system of claim 11 wherein the order match-
off process further comprises:

a process to execute the order against the one
of the best bid or best offer that is at the opposite
side of the market.

10

13.   The system of claim 11 further comprising:

a process to request a cancellation of a quote
at the side of the market in which an internalized order
will be executed.

15

14.   The system of claim 11 further comprising:

a routing process to route an order to a market
participant corresponding to the participant that has the
one of the best bid or best offer that is at the opposite
20 side of the market.

15.   The system of claim 11 wherein the match-off
process further comprises:

a process to execute the order against the one
25 of the best bid or best offer that is at the opposite
side of the market.

16.   The system of claim 1 further comprising:

a process to request a cancellation of a quote
30 at the side of the market in which an internalized order
will be executed.

17.   The system of claim 1 further comprising:

a routing process to route an order to a market participant corresponding to the participant that has the one of the best bid or best offer that is at the opposite

5   side of the market.

18.   A computer program product for operating a market system comprises instructions for causing a computer to:

10   receive orders and matches orders against quotes posted in the system on a time priority basis;

check if a market participant identification associated with a received order matches a market participant identification representing a quote in the

15   system that is at the best bid or best offer price in the system.

FIG. 1

Negotiation
Orders

Liability
Orders

Quotes

20, Order/Quote Collector Facility

INTERFACE, 27

Delivery

Auto-X

Quote

FIG. 2A

19

19a QUOTE

19b RESERVE

19c ATTR

FIG. 1A

FIG. 2B

QUOTE/ORDER
MANAGER, 26a

MONTAGE
MANAGER, 26b

INTERNAL EXECUTION
MANAGER, 26c

ORDER
EXECUTION/ROUTING
MANAGER, 26d

LOCK/CROSS
MANAGER, 26e

ODDLOT
MANAGER, 26f

COLLECTOR FACILITY
PROCESS, 25

26a

42 → RECEIVE
QUOTES/ORDERS
TIME STAMP

43

RESERVE QUOTE

MKTB.

STORE
RESERVE
QUOTE

44 → COMPARE TO EXISTING
ATTRIBUTABLE QUOTES

47

CURRENT
LEVELS

46

WITHIN CURRENT
QUOTE LEVELS

NO

YES

52

STORE QUOTE
AT NEW LEVEL

DETERMINE NEW
NON-MARKETABLE
QUOTE SIZES

48

BETTER
DISPLAYED
PRICE

NO

54

EXIT

50

DISPLAY NEW
NON-MARKETABLE
QUOTES

CHANGE CURRENT
LEVELS
DISPLAY NEW
LEVELS AND
QUOTES
AT NEW LEVELS

56

FIG. 3A

26b

60, DETERMINE
PRICE LEVELS

61

ATTRIBUTABLE
QUOTE

YES

MKTB.

66

STORE AND
SUM AGGREG
QUOTE

64

DISPLAY QUOTE IN
NEGOTIATION MONTAGE

68

DISPLAY
AGGREGATE
QUOTE

FIG. 3B

26c

```
┌─────────────────────────────┐
│      RECEIVE ORDER          │──── 66
└─────────────────────────────┘
                │
                ▼
         ╱╲
   67a ╱    ╲
     ╱ ORDER ID + ╲     NO
    ╱  QUOTE ID OFBEST ╲──────────┐
    ╲   BBO?          ╱           │
     ╲              ╱             │
       ╲          ╱   68          ▼
         ╲      ╱          ┌──────────────────┐
    YES   ╲  ╱             │  EXECUTE/ROUTE   │
           ▼               │  IN TIME PRIORITY│
                           │  (FIG. 7)        │
                           └──────────────────┘
   67b                              │
 ┌─────────────────────────┐        ▼
 │   CALL REQUEST CANCEL    │     ╭───────╮
 └─────────────────────────┘     │ EXIT  │
             │                   ╰───────╯
             ▼
 67c
 ┌─────────────────────────────┐
 │ MATCH OFF ORDER EXECUTION   │
 │    AGAINST THAT QUOTE       │
 └─────────────────────────────┘
```

FIG. 4

26d

```
┌─────────────────────────────────┐
│          72, ORDER              │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│   74, CALL INTERNALIZE  ORDER   │
│          MANAGER 26c            │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│      76, EXECUTE AGAINST        │
│   DISPLAYED SIZE OF QUOTING     │
│        PARTICIPANTS  IN         │
│      PRICE/TIME PRIORITY        │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│      78, EXECUTE AGAINST        │
│     DISPLAYED QUOTES OF         │
│   NON-MKT PARTICIPANTS IN       │
│      PRICE/TIME PRIORITY        │
└─────────────────────────────────┘
                 │
                 ▼
┌─────────────────────────────────┐
│      80, EXECUTE AGAINST        │
│   RESERVE SIZE OF MARKET        │
│        PARTICIPANTS  IN         │
│      PRICE/TIME PRIORITY        │
└─────────────────────────────────┘
```

FIG. 5A

FIG. 5B

26e

102, DETERMINE PARTICIPANT TYPE

AUTO EXEC. ECN'S

MARKET MAKERS

NON- AUTO EXEC.

110, DECREMENT
DISPLAYED SIZE

104, DECREMENT
DISPLAYED SIZE

120, DECREMENT
DISPLAYED SIZE

112, SIZE = 0

106, SIZE = 0

122, MOVE TO
BOTTOM OF QUEUE

114, REMOVE
QUOTE

108, CALL AUTO
QUOTE REF.

116
BOTH SIDES
SIZE = 0

118, WITHDRAW
QUOTES

EXIT

FIG. 6

26f

132, ENTER ORDER

134, ORDER L/C? → EXIT

MARKET MAKERS

136, FORMAT QUOTE AS MLO ENTER IN SYSTEM

IS LOCK?

YES

138, ROUTE ORDER TO MP NEXT IN QUEUE WHO WOULD BE LOCKED

142, ROUTE ORDER TO MP NEXT IN QUEUE WHO WOULD BE CROSSED

140, EXECUTE AT PRICE OF LOCKING QUOTE/ORDER

144, EXECUTE AT PRICE OF CROSSED QUOTE/ORDER

EXIT

FIG. 7

26g →

162, ENTER ORDER

164, ODD LOT? — NO → EXIT

166, STORE ORDER IN ODD LOT FILE

YES

ODD LOT MARKETABLE?

172, RETRIEVE NEXT ODD LOT ORDER

174,, EXECUTE AGAINST NEXT PARTICIPANT WITHOUT CHANGING QUOTES

EXIT

FIG.8

FIG. 9

200 — 202

Bid (205)

Bid	Total	
$20.00	8,200	(205a)
$19.95	15,000	
$19.90	25,000	

Ask (207)

Ask	Total	
$20.05	3,000	(202a)
$20.10	5,000	(202b)
$20.15	15,000	(202c)

Inside Bid: $20.00 T: 9,000 A: 5,000   **Inside Ask: $20.05 T: 1,000 A: 1,000**

Last $20.05 **Hi:** $20.25 **Low:** $19.75 **PCL:** $19.75   **Q:** -0.30 **Vol:** 10,500,000

204 →

SIZE			SIZE		
MM1	$20.00	5,700	ECN2	$20.00	5,700
MM2A	$20.00	1,000	MM4A	$20.05	1,000
ECN1	$20.00	1,500	ECN1	$20.10	300
MM2	$19.95	800	MM2A	$20.10	800
ECN2	$19.95	1,000	MM1	$20.10	500
ECN3	$19.95	500	ECN4	$20.15	500
MM3A	$19.95	1,500	MM3A	$20.15	2,500
MM1A	$19.90	100	MM2	$20.15	100
ECN4	$19.90	1,000	ECN3	$20.15	1,000
MM4	$19.90	100	MM4	$20.20	1,000
	$19.90	1,000		$20.25	1,000